as a transition form connecting the two groups of *Trigoniæ* above mentioned. The description of the new species was accompanied by a note on the Purbeck strata of the Vale of Wardour by the Rev. W. R. Andrews.

BIBLIOGRAPHICAL NOTICES.

Fossil Sponge-Spicules from the Upper Chalk, found in the Interior of a Single Flintstone from Horstead Norfolk. By George Jennings Hinde, F.G.S. With five Plates. 8vo. Munich, 1880.

Under this title appears Mr. (now Dr.) Hinde's "Inaugural Dissertation" for the degree of "Dr. of Philosophy" in the University of Munich, published at Munich in the month of November 1880. For this he very wisely took some fossil sponge-spicules obtained from Horstead for comparison with those which Prof. Zittel has collected in the Palæontological Museum of Munich, and thus met with the disinterested generosity of one whose love for his profession goes hand in hand with his great ability for practising it.

With such aid it is no wonder that he should have produced a "Dissertation" alike honourable to himself and to those by whom he has been assisted, viz. Prof. Zittel and Herr Conrad Schwager, respectively superintendent and assistant in the Palæontological Museum at Munich—the former having assisted by his extensive knowledge and liberality, and the latter, among other things, by his aptitude in drawing with the camera lucida.

The "Dissertation" is illustrated by five plates, containing 165 figures, which, "as far as possible," have been drawn to the scale of "20 diameters," in order that "their relative dimensions" might be appreciated; while the measurements have been given in parts of a metre, that *they* may be most generally useful.

Commencing with a description of the kind of Upper-Chalk Flint in whose interior the sponge-spicules were found, viz. "a potstone or paramoudra," about a foot in diameter, with the mouth closed by extension of the flint,—the contents generally are enumerated; after which the structure and mineral composition of the fossil sponge-spicules are noticed in particular, ending with the following commendable enunciation, viz.:—"In several instances the correspondence in form and size of the spicules is so close to that of sponges already determined, that no doubt can arise of their belonging to the same species. Under these circumstances I have arranged these spicules under the different genera with which they seemed to have the closest relationship; and in only a few exceptional cases, in which the peculiar form or dimensions of the spicule rendered it highly probable that it belonged to some hitherto unrecognized sponge, have I ventured to give a name to it, to facilitate reference in the future" (p. 18).

Following the systematic arrangement which is given by Prof. Zittel in his "Beiträge zur Systematik der fossilen Spongien" (see 'Annals,' 1879, vol. iii. p. 304), Mr. Hinde begins his descriptions

in detail with Zittel's "Monactinellidæ"—that is, sponges which consist only of "spicules which possess a single unbranched interior canal," which, so long as the monactinellid has a peculiar feature, answers very well for identification; but when the spicule is a simple acerate—that is, linear, more or less curved (for if looked at in a favourable direction it is seldom otherwise), fusiform, gradually sharp-pointed, and smooth, as in pl. i. figs. 1–3,—the power of the term continues for the spicule, but ends for that of distinction of species; for this form is perhaps of all the most common, and extends to totally different families. Mr. Hinde has evidently experienced this difficulty.

Again, the "Tetractinellidæ" of Marshall, characterized by spicules with "four arms or rays, one usually much longer than the others, radiating from a centre" (p. 24), might do for the Pachytragida (Carter), but no other sponges. So the "Siliceous Globules" (p. 38) may belong to *Placospongia melobesioides*, Gray, whose skeleton-spicules are pin-like, with the *points outwards*, thus, with other concomitants, allying itself to the Suberitida (Carter). The "Quadrifid Spicules of *Pachastrella*" are less open to difficulty in this respect; while the fully formed spicules of Zittel's "Megamorina" and "Tetracladina" (Lithistina), and those of the order "Hexactinellidæ (O. Schmidt)," are self-evident, both recent and fossil, as well as the incomplete ones of the former (pl. iv. figs. 24–34), which we now know to be only a transitionary state of the disk to the ulterior development of the Lithistid spicule. Here it is that Prof. Zittel, by his sagacity, success, and indefatigable labours both at home and in the field, has so enriched the Palæontological Museum of Munich—which, together with his numerous discoveries, quite marks an epoch in the early history of the Spongida; while the exquisite beauty of the fossil remains he has collected, once seen and begun to be studied, is so fascinating as to recall to mind the saying "*Vestigia nulla retrorsum.*"

Lastly, Mr. Hinde alludes to the destruction of the spicule, observing that "the peculiar form of the perforations (in the fossil spicule) shows that they have been produced by the action of some living organism," but different from that of Duncan's *Palæachlya perforans*.

Having gone through all the sponge-spicules of the "paramoudra" both descriptively and comparatively, not only with reference to the recent but the fossil sponge-spicules also, that have been made known, Mr. Hinde adds a most interesting "Summary" of his results, which must be read *in extenso* to be properly appreciated; nor can we fail to notice in the "Postscript" that desire to which we alluded in the beginning, viz. not to create new genera or species before making himself acquainted with what has already been published on both fossil and recent sponges.

Finally, we would observe that, with such principles and opportunities, under the able and willing guidance of Prof. Zittel, it is hardly necessary to add that Mr. Hinde's "Inaugural Dissertation" tells us most satisfactorily the state of sponge-development at the time the Upper Chalk was deposited.